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EXAMINER

LAM, VINH TANG

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/580,123	Applicant(s) NISHI, KENJI	
	Examiner VINH LAM	Art Unit 2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 June 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) 4,6 and 15-29 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,5 and 7-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 June 2010 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims **1-3** and **5** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Bolas et al. (US Patent No. 5253832)** in view of **Chen et al. (US Patent No. 5822127)** and further in view of **Jernigan et al. (US Patent No. 3751981)**.

Regarding Claim **1**, (Currently Amended) **Bolas et al.** teach

an image display device (*Col. 3, Ln. 53-59, FIG. 1, i.e. 12*) which is supported by a portion (*Col. 3, Ln. 53-59, FIG. 1, i.e. suspension system 10*) other than a user, which is adapted to be in contact with a face of the user (*Col. 3, Ln. 67, FIG. 1, i.e. to be worn snugly over the head of the user*) by using elastic members (*Col. 3, Ln. 66, FIG. 1, i.e. head strap 15*), and which is movable in accordance with a movement (*Col. 4, Ln. 5-10, FIG. 1, i.e. bearing 20 allowing for rotation about a vertical axis*) of the face of the user, wherein when said image display device is worn by the user.

Although **Bolas et al.** do not *explicitly* teach positioning a gravity center of said image display device to be located in a rearward and downward direction relative to eyeballs of said user when said user is in an upright position.

However, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to recognize **Bolas et al.**'s *counterbalanced* system would have positioning a gravity center of said image display device to be located in a rearward and downward direction relative to eyeballs of said user when said user is in an upright position (*FIG. 1, i.e. the **intersection point** of bearings **18** and **20** axes*).

Furthermore, **Bolas et al.** do not *explicitly* teach that a portion of optical elements of said image display device is located at a rear side of said user's head by making light beams folded.

In the same field of endeavor, **Chen et al.** teach a portion of optical elements of said image display device is located at a rear side of said user's head by making light beams folded (*Col. 5, Ln. **28-40**, FIG. 2*).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to combine **Bolas et al.** teaching of a counterbalance display apparatus with **Chen et al.** teaching of a display system distributing its weight evenly in the frontal and posterior portions *to substantially reduce the weight of the apparatus at the same time ergonomically improve user movement while operating the head-mount display*.

However, **Bolas et al.** and **Chen et al.** do not teach a counterweight mechanism utilizing special pulley system arrangement.

Being reasonably pertinent to improve ergonomic problem with which the applicant was concerned, **Jernigan et al.** teach,

wherein said image display device (*Col. 4, Ln. 52-61, FIG. 3, i.e. magazine carrier 78*) is connected with a counterweight (*Col. 4, Ln. 52-61, FIG. 3, i.e. weight 10*) by a string-like flexible member (*Col. 4, Ln. 52-61, FIG. 3, i.e. rope 104*) such that the counterweight is balanced with said image display device (*Col. 4, Ln. 52-61, FIG. 3, i.e. weight 10*), and wherein said string-like flexible member supports said image display device by suspending said image display device and said counterweight (*Col. 4, Ln. 52-61, FIG. 3*) via a pulley (*Col. 4, Ln. 52-61, FIG. 3, i.e. pulley 106 or 108*) which is set on a two-dimensional-direction driving mechanism (*Col. 4, Ln. 52-61, FIG. 3*) adapted to be movable on a horizontal flat surface (*Col. 4, Ln. 52-61, FIG. 3, i.e. surface extruding from 106 and 108*) that is located above the head of the user and that is supported by a floor (*Col. 4, Ln. 52-61, FIG. 3*).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to combine **Bolas et al.** and **Chen et al.** teaching of a counterbalance display apparatus distributing its weight evenly in the frontal and posterior portions with **Jernigan et al.** teaching of a counterweight mechanism utilizing special pulley system arrangement *to substantially reduce the weight of the apparatus at the same time ergonomically improve user movement while operating the head-mount display.*

Regarding Claim 2, (Previously Presented) **Bolas et al.** teach the image display device according to claim 1, wherein the gravity center of said image display device substantially coincides with an average, 3-axes' rotational movement center of the neck of the user (*Col. 4, Ln. 3-16, FIG. 1, i.e. 18, 20, and 22*).

Regarding Claim **3**, (Currently Amended) **Bolas et al.** teach an image display device which is supported by a portion other than a user so that said image display device is movable in three-dimensional directions in space, and so that said image display device is rotationally movable in the three-dimensional directions (*Col. 4, Ln. 3-16, Ln. 22-26, FIG. 1*), wherein said image display device is adapted to be in contact with a face of the user by using elastic members (*Col. 3, Ln. 66, FIG. 1, i.e. head strap 15*), and is movable and rotationally movable in accordance with movement of the face of the user (*Col. 4, Ln. 5-10, FIG. 1, i.e. bearing 20 allowing for rotation about a vertical axis*), said image display device comprising a plurality of rotational movement shafts (*Col. 4, Ln. 3-16, FIG. 1, i.e. 18, 20, and 22*) wherein each of the rotational movement shafts substantially coincides with a gravity center (*FIG. 1, i.e. the intersection point of bearings 18 and 20 axes*) of said image display device, and wherein when said image display device is worn by the user (*Col. 3, Ln. 66, FIG. 1, i.e. head strap 15*).

Although **Bolas et al.** do not *explicitly* teach positioning a gravity center of said image display device to be located in a rearward and downward direction relative to eyeballs of said user when said user is in an upright position.

However, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to recognize **Bolas et al.**'s *counterbalanced* system would have positioning a gravity center of said image display device to be located in a rearward and downward direction relative to eyeballs of said user when said user is in an upright position (*FIG. 1, i.e. the intersection point of bearings 18 and 20 axes*).

Furthermore, **Bolas et al.** do not *explicitly* teach that a portion of optical elements of said image display device is located at a rear side of said user's head by making light beams folded.

In the same field of endeavor, **Chen et al.** teach a portion of optical elements of said image display device is located at a rear side of said user's head by making light beams folded (*Col. 5, Ln. 28-40, FIG. 2*).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to combine **Bolas et al.** teaching of a counterbalance display apparatus with **Chen et al.** teaching of a display system distributing its weight evenly in the frontal and posterior portions *to substantially reduce the weight of the apparatus at the same time ergonomically improve user movement while operating the head-mount display*.

However, **Bolas et al.** and **Chen et al.** do not teach a counterweight mechanism utilizing special pulley system arrangement.

Being reasonably pertinent to improve ergonomic problem with which the applicant was concerned, **Jernigan et al.** teach,

wherein said image display device (*Col. 4, Ln. 52-61, FIG. 3, i.e. magazine carrier 78*) is connected with a counterweight (*Col. 4, Ln. 52-61, FIG. 3, i.e. weight 10*) by a string-like flexible member (*Col. 4, Ln. 52-61, FIG. 3, i.e. rope 104*) such that the counterweight is balanced with said image display device (*Col. 4, Ln. 52-61, FIG. 3, i.e. weight 10*), and wherein said string-like flexible member supports said image display device by suspending said image display device and said counterweight (*Col. 4, Ln. 52-*

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61, FIG. 3) via a pulley (*Col. 4, Ln. 52-61, FIG. 3, i.e. pulley 106 or 108*) which is set on a two-dimensional-direction driving mechanism (*Col. 4, Ln. 52-61, FIG. 3*) adapted to be movable on a horizontal flat surface (*Col. 4, Ln. 52-61, FIG. 3, i.e. surface extruding from 106 and 108*) that is located above the head of the user and that is supported by a floor (*Col. 4, Ln. 52-61, FIG. 3*).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to combine **Bolas et al.** and **Chen et al.** teaching of a counterbalance display apparatus distributing its weight evenly in the frontal and posterior portions with **Jernigan et al.** teaching of a counterweight mechanism utilizing special pulley system arrangement *to substantially reduce the weight of the apparatus at the same time ergonomically improve user movement while operating the head-mount display.*

Regarding Claim 5, (Previously Presented) **Bolas et al.** teach the image display device according to claim 3, wherein to each of said rotational movement shafts, a rotational movement amount measuring sensor is set, and wherein said image display device further comprises a device for determining an output image of said image display device in accordance with outputs from said rotational movement amount measuring sensors (*Col. 6, Ln. 23-28, FIGs. 4-6*).

2. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Bolas et al. (US Patent No. 5253832 (already of record))** in view of **Chen et al. (US Patent No.**

5822127) in view of **Jernigan et al. (US Patent No. 3751981)** and further in view of **Meredith (US Patent No. 4257062)**.

Regarding Claim 7, (Previously Presented) **Bolas et al.**, **Chen et al.**, and **Jernigan et al.** teach the image display device according to claim 1 or 3.

However, **Bolas et al.**, **Chen et al.**, and **Jernigan et al.** do not teach the sandwiching means for functioning as earphones, and the position between the face and image display device being fixed.

In the same field of endeavor, **Meredith** teaches said image display device is, via sandwiching means for sandwiching the face from right and left side face directions adapted to contact with the face of the user, wherein said sandwiching means is also for functioning as earphones, and wherein a positional relationship between the face and said image display device is substantially fixed by said sandwiching means (*Col. 2, Ln. 59-68, FIG. 1*).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to combine **Bolas et al.**, **Chen et al.**, and **Jernigan et al.** teaching of an image display device having counterbalanced system with **Meredith** teaching of sandwiching means for functioning as earphones, and the position between the face and image display device being fixed *to enhance interfacing quality video and audio for user*.

3. Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Bolas et al. (US Patent No. 5253832 (already of record))** in view of **Chen et al. (US**

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Patent No. 5822127) in view of **Jernigan et al. (US Patent No. 3751981)** and further in view of **Takahashi (US Patent No. 6014261)**.

Regarding Claim 8, (Previously Presented) **Bolas et al., Chen et al., and Jernigan et al.** teach the image display device according to claim 1 or 3.

However, **Bolas et al., Chen et al., and Jernigan et al.** do not teach that the image display device has a function of projecting and imaging, via a relay optical system, a light emitted from a two-dimensional type image forming device onto user's eye wherein the image having a field of view angle of ± 22.5 degrees or more.

In the same field of endeavor, **Takahashi** teaches that the image display device has a function of projecting and imaging, via a relay optical system, a light emitted from a two-dimensional type image forming device onto retinas in the right and left eyeballs of the user, and wherein the imaged image is a wide range image having a field of view angle of ± 22.5 degrees or more (*Col. 2, Ln. 59-68, FIG. 1*).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to combine **Bolas et al., Chen et al., and Jernigan et al.** teaching of an image display device having counterbalanced system with **Takahashi** teaching of a image display device having function of projecting and imaging, via a relay optical system, a light emitted from a two-dimensional type image forming device onto user's eye wherein the image having a field of view angle of ± 22.5 degrees or more *to enhance the quality of virtual reality experience*.

Regarding Claim **9**, (Previously Presented) **Bolas et al.**, **Chen et al.**, and **Jernigan et al.** teach the image display device according to claim 1 or 3.

However, **Bolas et al.**, **Chen et al.**, and **Jernigan et al.** do not teach that the image display device further comprises image forming device, light diffusing bodies, relay optical systems, eyepiece optical systems for transmitting images to the user's eyes.

In the same field of endeavor, **Takahashi** teaches that said image display device further comprises a two-dimensional type image forming device, and second light diffusing bodies, first and second relay optical systems that respectively relay light emitted from said two-dimensional type image forming device to the and light diffusing bodies, and first and second eyepiece optical systems that respectively project and image transmitted images of said first and second light diffusing bodies onto retinas in the right and left eyeballs of the user, wherein the first light diffusing body, the first relay optical system and the first eyepiece optical system are for the right eye of the user, and the second light diffusing body, the second relay optical system and the second eyepiece optical system are for the left eye of the user (*Col. 12, Ln. 20-24, Col. 1, Ln. 60-65, FIG. 21(b)*).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to combine **Bolas et al.**, **Chen et al.**, and **Jernigan et al.** teaching of an image display device having counterbalanced system with **Takahashi** teaching of the image display device further comprises image forming device, light diffusing bodies, relay optical systems, eyepiece optical systems for transmitting images

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to the user's eyes *to correctly provide accurate images to user at the same time to reduce the weight and inertia of the image display device.*

4. Claim **10** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Bolas et al. (US Patent No. 5253832 (already of record))** in view of **Chen et al. (US Patent No. 5822127)**, in view of **Jernigan et al. (US Patent No. 3751981)**, in view of **Takahashi (US Patent No. 6014261)**, and further in view of **Spitzer et al. (US Patent No. 6879443)**.

Regarding Claim **10**, (Previously Presented) **Bolas et al.**, **Chen et al.**, **Jernigan et al.**, and **Takahashi** teach the image display device according to claim 9.

However, **Bolas et al.**, **Chen et al.**, **Jernigan et al.**, and **Takahashi** do not teach that the image display device further comprising an adjusting mechanism for focusing optical images accordingly to user's facial differences.

In the same field of endeavor, **Spitzer et al.** teach that the image display device further comprising an adjusting mechanism for adjusting a distance between optical centers of said first and second eyepiece optical systems and a distance between first and second transmitted images having transmitted through said light diffusing bodies so that the distances correspond to an eye-width of the user (*Col. 4, Ln. 19-26, Ln. 31-39, FIGs. 1, 4, & 5*).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to combine **Bolas et al.**, **Chen et al.**, **Jernigan et al.**, and **Takahashi** teachings of a counterbalanced image display device with internal optical

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structures with **Spitzer et al.** teaching of an adjusting mechanism for focusing optical images *to accordingly accommodate to user's facial differences therefore improving image qualities namely sharpness, clarity, and correct focus.*

5. Claims **11-12** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Bolas et al. (US Patent No. 5253832 (already of record))** in view of **Chen et al. (US Patent No. 5822127)**, in view of **Jernigan et al. (US Patent No. 3751981)**, in view of **Takahashi (US Patent No. 6014261)**, and further in view of **Oshima et al. (US Patent No. 4268127)**.

Regarding Claim **11**, (Previously Presented) **Bolas et al.**, **Chen et al.**, **Jernigan et al.**, and **Takahashi** teach an image display device according to claim 9.

However, **Bolas et al.**, **Chen et al.**, **Jernigan et al.**, and **Takahashi** do not teach that the light diffusing bodies being transmission type diffusing plates on which abrasive grains of a metal oxide or metallic carbide being controlled with micron-grade are coated.

In the same field of endeavor, **Oshima et al.** teach the light diffusing bodies, which diffuse light, are each a transmission type diffusing plate constituted by a transmission plate on which abrasive grains of a metal oxide or metallic carbide of which grain diameter is precisely controlled with micron-grade are coated (*Col. 2, Ln. 61-68, Col. 3, Ln. 1-2*).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to combine **Bolas et al.**, **Chen et al.**, **Jernigan et al.**, and **Takahashi** teachings of a counterbalanced image display device with internal optical structures with **Oshima et al.** teaching of the light diffusing bodies being transmission type diffusing plates on which abrasive grains of a metal oxide or metallic carbide being controlled with micron-grade are coated to improve image quality for use with high definition or resolution.

Regarding Claim **12**, (Previously Presented) **Oshima et al.** teach the image display device according to claim 11, said abrasive grains are made of at least one of silicon carbide, chromium oxide, tin oxide, titanium oxide, magnesium oxide, and aluminum oxide and said transmission plate is a polyester film (*Col. 2, Ln. 61-68, Col. 3, Ln. 1-2*).

6. Claims **13-14** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Bolas et al. (US Patent No. 5253832 (already of record))** in view of **Chen et al. (US Patent No. 5822127)**, in view of **Jernigan et al. (US Patent No. 3751981)**, in view of **Takahashi (US Patent No. 6014261)**, and further in view of **Sedlmayr (US Patent No. 5347644)**.

Regarding Claims **13** and **14**, (Previously Presented) **Bolas et al.**, **Chen et al.**, **Jernigan et al.**, and **Takahashi** teach the image display device according to claims 8 and 9 respectively.

However, **Bolas et al.**, **Chen et al.**, **Jernigan et al.**, and **Takahashi** do not teach that the two-dimensional type image forming device comprises of three pieces of two-dimensional transmission type or reflection type liquid crystal device elements corresponding to the colors RGB and perpendicular to light beam.

In the same field of endeavor, **Sedlmayr** teach that the two-dimensional type image forming device comprises:

three pieces of two-dimensional transmission type or reflection type liquid crystal device elements, each corresponding to a respective one of the colors of green (G), blue (B), and red (R), and perpendicular to light beam emitting direction (*Col. 2, Ln. 61-68, Col. 3, Ln. 1-2*),

an illumination device that illuminates said liquid crystal device elements (*Col. 2, Ln. 61-68, Col. 3, Ln. 1-2*), and

an image combining device that combines lights emitted from said liquid crystal device elements into a single image (*Col. 2, Ln. 61-68, Col. 3, Ln. 1-2*).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to combine **Bolas et al.**, **Chen et al.**, **Jernigan et al.**, and **Takahashi** teaching of a counterbalanced image display device with internal optical structures with **Sedlmayr** teaching of the two-dimensional type image forming device comprises of three pieces of two-dimensional transmission type or reflection type liquid crystal device elements corresponding to the colors RGB and perpendicular to light beam *to reduce the apparatus weight* while improving quality image and enhancing virtual reality experience for user.

Response to Arguments/Amendments/Remarks

7. Claims 4 and 6 are canceled.
8. Claims 15-29 are withdrawn.
9. Applicant's arguments with respect to claims 1 and 3 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to VINH T. LAM whose telephone number is (571)270-3704. The examiner can normally be reached on M-F (7:00-4:30) EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amare Mengistu can be reached on (571) 272-7674. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Vinh T Lam/
Examiner, Art Unit 2629

/Amare Mengistu/

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Supervisory Patent Examiner, Art Unit 2629